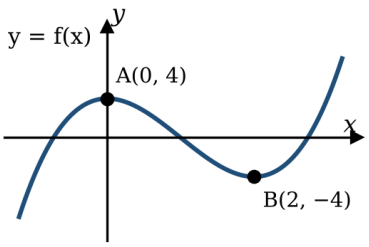
Day 134 **A Level Maths: A Tier 10-a-day**

1 Solve $2\sin^2 x + \cos x - 2 = 0$ for $-180° \leq x \leq 180°$.

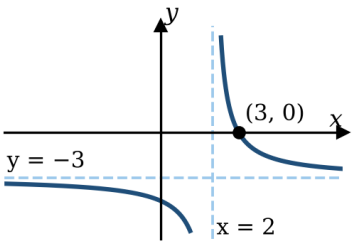
2 The diagram shows the curve y = f(x), with turning points A and B.
Find the coordinates of the turning points of
(a) y = −f(x) (b) y = f(x + 2)



3 X, the score (marks), is normally distributed with mean 54 and standard deviation 12.
Find (a) P(X > 28.8) (b) P(28.8 < X < 37.2), each to 3 s.f.

4 θ is small and measured in radians. Use small angle approximations to show that
$3\sin 2\theta + \cos\theta = 1.5$
can be written as $a\theta^2 + b\theta + c = 0$ with integers a, b, c. Hence find the approximate solution with $0 < \theta < 0.8$, to 3 s.f.

5 The diagram shows the curve $y = \frac{k}{x - a} + b$ with asymptotes as shown. Find the values of k, a and b, and the coordinates where the curve crosses the axes.



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6 A particle P moves on the x-axis with velocity v = $(3t^2 - 24t + 45)$ m s^{-1} at time t s, $t \geq 0$, and starts at O. Find (a) the times when P is at instantaneous rest, (b) the total distance P travels in the first 8 s.	
7 Solve $x(\sqrt{2} - 2) = 4 + 3\sqrt{2}$, writing x in the form $p + q\sqrt{2}$.	
8 A particle is projected up a line of greatest slope of a smooth plane inclined at α. It passes A, 29.4 m from the start, after 4 s and again after 6 s. Find (a) the speed of projection, (b) α to 1 d.p. Take g = 9.8.	
9 Solve $3\text{cosec}^2 x - 6\cot x - 27 = 0$ for $-180° < x < 180°$, $x \neq 0$. Give answers to 1 d.p.	
10 On each independent trial, the probability that a biased die shows a six is $\frac{1}{4}$. X is the number of trials up to and including the first success. (a) Find P(X = 3) and E(X). (b) Find the least m with $P(X \leq m) > 0.99$.	